



SP500 Operation Manual





Copyright© by Trotec Produktions und Vertriebs Ges.m.b.H.

All rights reserved.

Anyone who reproduces, copies or distributes this document, or parts of it, without the approval of Trotec Produktions und Vertriebs Ges.m.b.H. is subject to prosecution.

We do not assume liability for any errors contained in this documentation.

We reserve the right to make technical changes.

Trotec Produktions und Vertriebs Ges.m.b.H.
Linzer Strasse 156,
A-4600 Wels, OÖ.
AUSTRIA

Tel.: +43-(0)7242-239-0
Fax: +43-(0)7242-239-7380

trotec@troteclaser.com
www.troteclaser.com





Table of Contents

1 Manufacturing label	5
2 Product Components	6
3 Preface.....	7
3.1 General.....	7
3.2 Product Tracking	8
4 Technical Data	9
4.1 General Description.....	9
4.2 Intended Use	9
4.3 Dimensions.....	10
4.4 Mechanical Design	11
4.5 Control System.....	12
4.6 Laser Tubes	12
4.7 Laser Safety	12
4.8 Ambient Conditions	12
4.9 Options	12
4.10 Electrical Connection.....	13
4.10.1 Electrical connection for laser system	13
4.10.2 Electrical connection for water cooling (optional)	13
4.11 Materials.....	14
5 Safety	15
5.1 Safety Instructions.....	15
5.1.1 Intended user group.....	15
5.1.2 Operating instructions / Safety equipment.....	15
5.2 General Safety Instructions	16
5.2.1 General.....	16
5.2.2 Laser.....	19
5.2.3 Transport	20
5.3 Secondary Risks	21
5.3.1 General.....	21
5.3.2 Crushing hazard	21
5.4 Signage	22
6 Transport - Storage – Setup.....	24
6.1 Forklift transport	24
6.2 Lifting points	24
6.3 Shipping conditions	25
6.4 Unloading, inspection and damage reporting	25
6.5 Storage conditions.....	25
6.6 Storage Location	25
6.7 Installation Site	26
6.8 Space Requirements.....	26
6.9 Necessary Feed Lines.....	26
6.10 Setup	27
6.11 Connections	28
7 Machine view.....	29
8 Operation.....	30
8.1 Key pad – Overview	30





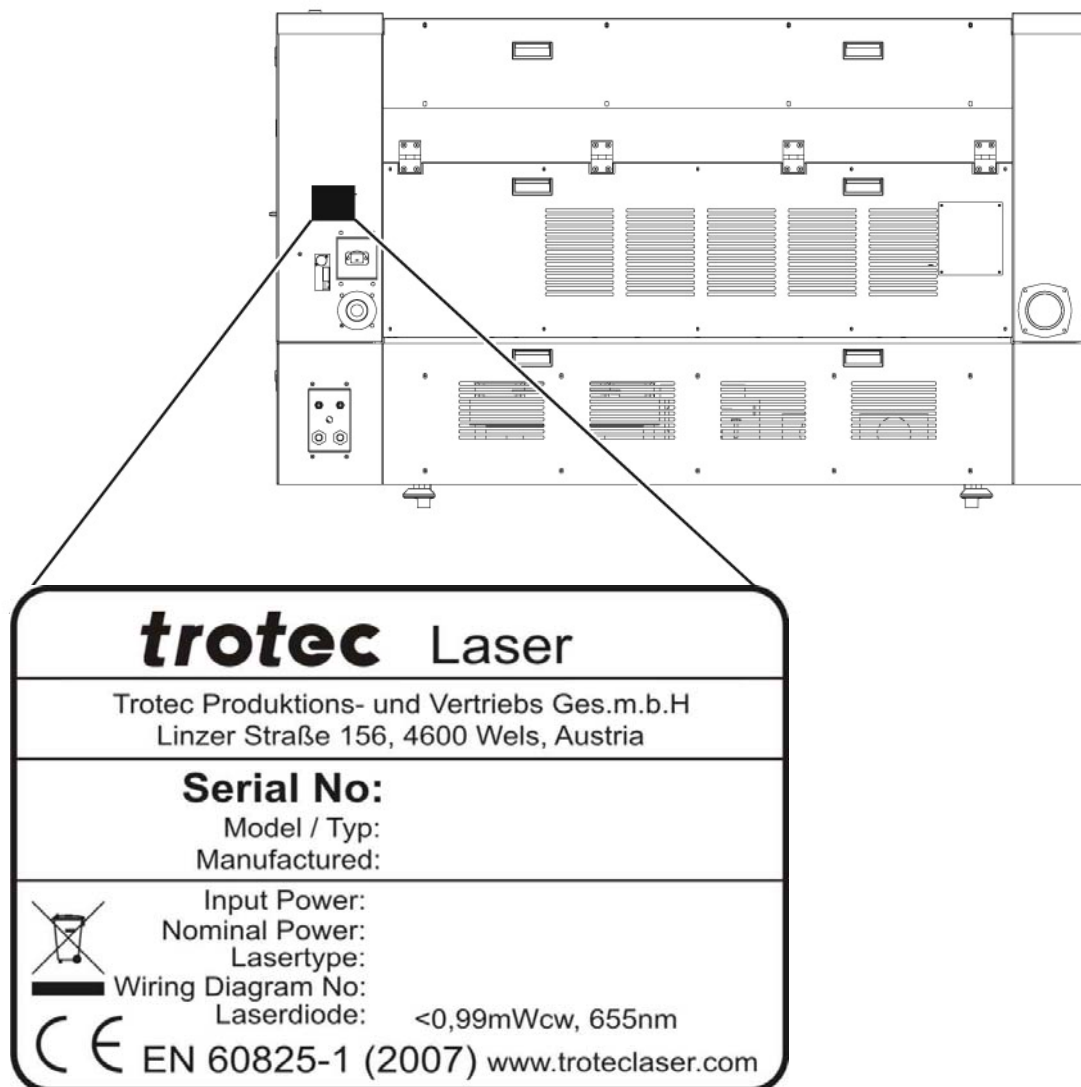
Table of Contents

8.2 Key pad – Description	31
8.3 Workpiece Removal Door	34
8.4 Workpiece Removal Door	34
8.5 Tables.....	35
8.5.1 Base Frame (with/without lamellas).....	35
8.5.2 Engraving Table (Standard table).....	35
8.5.3 Vacuum Table.....	36
8.5.4 Cutting Table	36
8.6 Lenses.....	37
8.7 Operation.....	38
9 Maintenance	40
9.1 Cleaning optics on the Laser Head	40
9.2 Cleaning the Mirrors	41
9.3 Maintenance plan	42
10 Appendix	43
10.1 EU – Declaration of conformity.....	43
10.2 Acceptance report	44
10.3 Training Verification Form	45
10.4 Response Form.....	46
10.5 How to create a Service File	47



1 Manufacturing label

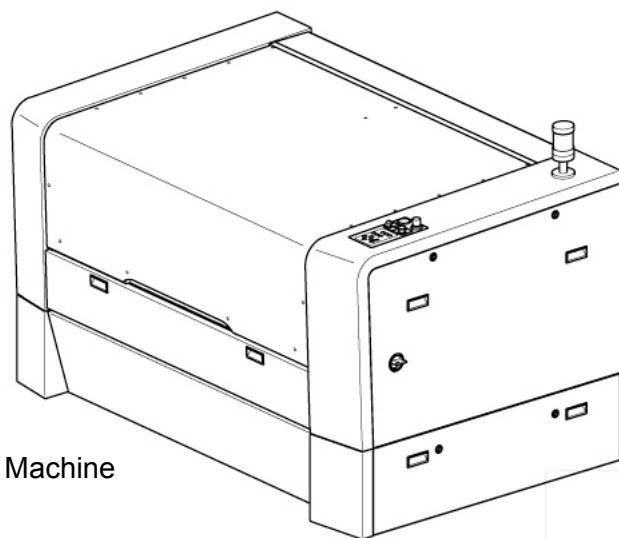
You find the manufacturing label with the CE-sign on the back side of the machine.



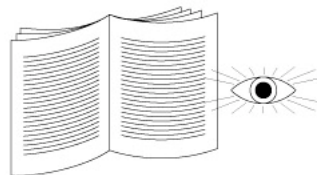
Enter the serial number, model and year of manufacture from the manufacturing label here. This information is important for troubleshooting problems with the product and for ordering replacement parts.



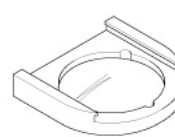
2 Product Components



Machine

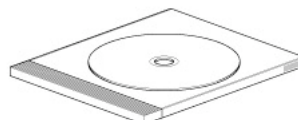


Operating instructions
Please read !

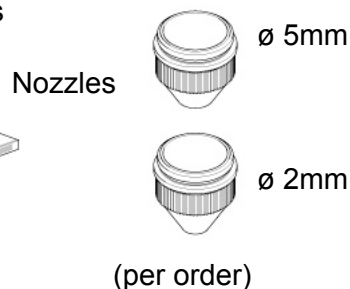


Lenses

2,0"



CD Rom

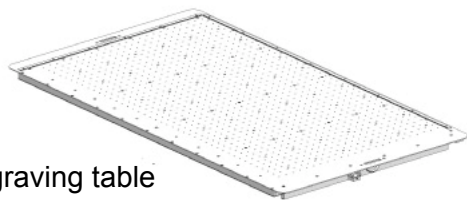


Nozzles

ø 5mm

ø 2mm

(per order)



Engraving table
(standard table)

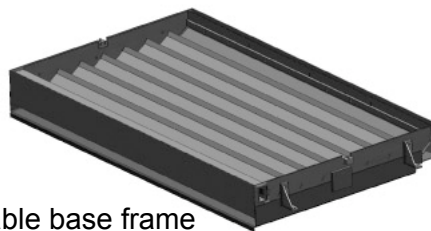
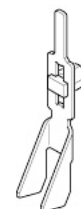
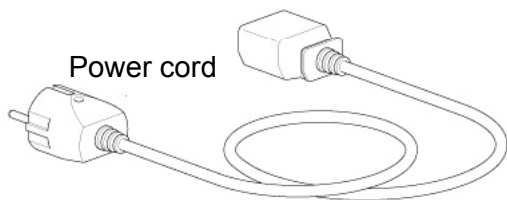


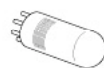
Table base frame



Focusing tool



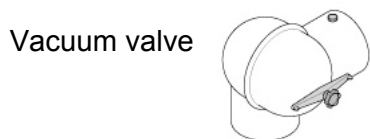
Power cord



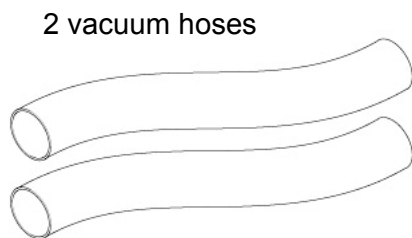
Bypass jumper for
Pass-through



Vacuum connection cable



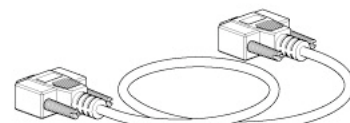
Vacuum valve



2 vacuum hoses



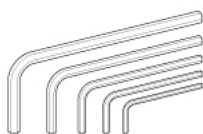
Broom with
holder



RS232 cable (per order)



USB cable



Allen wrench kit
7-part



Cleaning kit





3 Preface

3.1 General

This operating manual is intended to simplify the following for you:

- Learning about the machine, and
- Utilizing the machine's capabilities according to its intended use.

The operating manual contains important notes on how to operate the machine:

- Safely,
- Properly, and
- Economically

Following the operating instructions helps you to:

- Avoid hazards and risks,
- Minimize repair costs and downtimes, and
- Increase the reliability and service life of your machine.





3.2 Product Tracking

We have a legal duty to track our products after delivery to our customers.

In particular, this relates to:

- Recurring faults in functions
- Anything that is unclear, e.g. in operation, maintenance or instructions
- Any accidents that occur
- Other unusual observations
- Recommendations for improvement, requests

This information serves as a basis for potential corrections and/or changes to the product, and it is therefore of great interest to us.

We request that you inform us of any such events and offer us your recommendations. This is the only way that we can improve our products as necessary, and to make them as safe and reliable as possible.

Please use the response forms included in the Appendices for this purpose.





4 Technical Data

4.1 General Description

The SP500 consists of a machine and a base frame.

All electronic components are integrated in the base frame.

All necessary connections are made on the back side of the SP500.
Controls for the SP500 are located on the keypad.

The SP500 is equipped with an interlock safety system. When the interlock is activated, only setup tasks can be performed on the SP500.

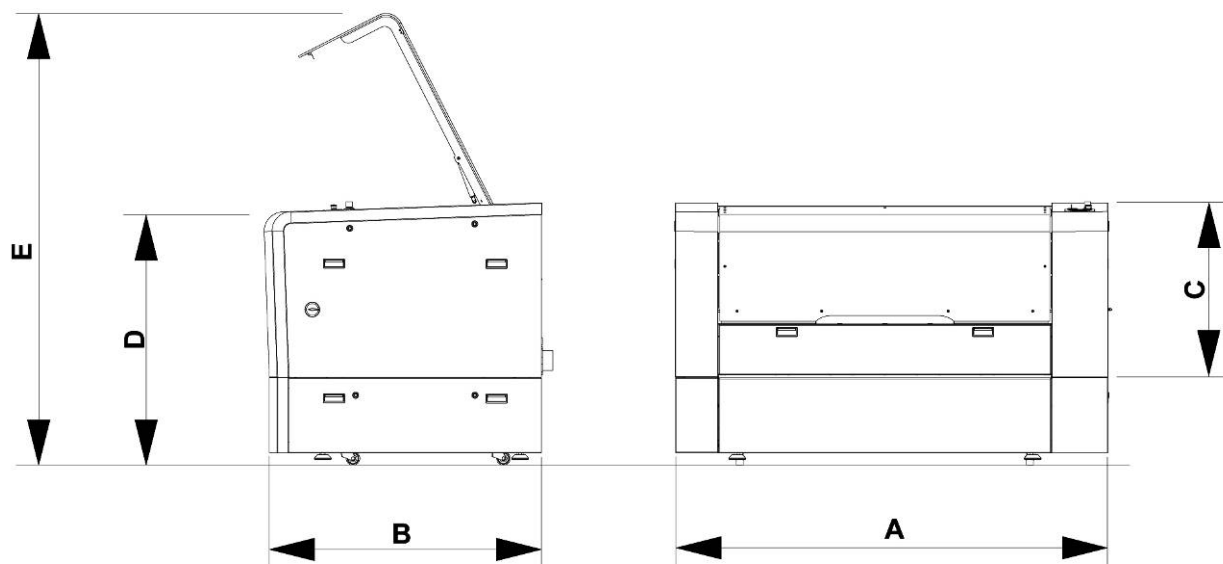
The machine has a manual table changing system that enables use of the optimal table for specific jobs. This system ensures faster and safer table changes.

4.2 Intended Use

The Trotec SP500 is designed for engraving and cutting of the materials listed in this document.



4.3 Dimensions



Item	Description	Dimension	Units
A	Length	1920 (79.59)	mm (inch)
B	Width	1240 (48.82)	mm (inch)
C	Height, closed without base frame	780 (30.71)	mm (inch)
D	Height, closed with base frame	1140 (44.88)	mm (inch)
E	Height, open	2100 (82.68)	mm (inch)

W

Weight – depends on product model 520 to 580 kg
(1,393 to 1,554 lbs)





4.4 Mechanical Design

Working area	1245 x 710 mm (49.02 x 27.95 inch)
Feed area	1420 x 820 mm (55.91 x 32.28 inch)
Working table	With servomotor controlled Z axis Computer controlled and programmable
Max. workpiece height - with standard table: - with cutting table or vacuum table: - with tables removed (absolute flatness cannot be guaranteed):	150 mm (5.91 inch) 120 mm (4.72 inch) 300 mm (11.81 inch) over an area of 1245 x 610 mm (49.01 x 24.01 inch)
Max. engraving speed	254 cm/sec 100 inch/sec
Max. cutting speed	Depends on: - Material - Material thickness - File geometry - Laser power
Motor	Brushless DC servomotor
Encoder	Incremental
Lenses	Standard: 2,0" (black) Optional: 2.5" (silver) and 5.0" (blue) 2.5" clearence (bright green) 3.75" rotary (violett) Lenses and all reflective mirrors are air-flushed
Max. workpiece weight	25 kg (67 lbs) distributed over entire working area
Precision	±0,1 mm (±0.00394 inch) over entire working area (depends on material)
Repeatability	< ±15 µm (< ±0.00059 inch)



4.5 Control System

Laser power	Adjustable 0 – 100% (typically 10-100%)
Hardware Interface	USB, RS-232 (RS-232 mandatory for TroCAM and iCut)
Software Interface	ASCII, HPGL, Trotec Protocol

4.6 Laser Tubes

Laser tubes	Sealed off CO2 laser, maintenance free, Laser power of 60-200W
Wavelength	10,6 µm

4.7 Laser Safety

Laser class	CDRH Laser Safety; CE tested Laser class 2 Laser class 4 with pass-through
Interlock	Dual interlock safety system

4.8 Ambient Conditions

Prescribed ambient temperature of +15° to +25°C (+59° to +77°F)
 Humidity of 40% to max. 70%, no condensation,
 dust-free environment (2nd degree per IEC60947-1)

4.9 Options

Pass-through unit (rear)	1245 x 710 mm (49.01 x 27.95 inch) max. pass-through height: 63 mm (2.48 inch)
Rotary engraving attachment	with conus, rollers or combined
CCD camera	max. working area: 1100 x 700 mm (43.31 x 27.56 inch)
Gas kit (for compressed air connection or process gases as Neutrogen, Argon, protective gas)	Intended for regulation of compressed air and process gases (air and gases must be free of small mechanical parts as well as water and oil) Suitable for a max. flow rate of 150 l/min (39.626 gal.(US)) at max. 10 bar (145 psi) Pressure connection on product for hose diameter of 6 mm (0.236 inch)



4.10 Electrical Connection

4.10.1 Electrical connection for laser system

	Laser Power	Voltage	Fuse	Frequency	Phases	Power
Air Cooled	60Wac	208/230 [V]	16A slow	50/60 [Hz]	L, N, PE	2,700 [W]
	75Wac	208/230 [V]	16A slow	50/60 [Hz]	L, N, PE	2,700 [W]
	85Wac	208/230 [V]	20A slow	50/60 [Hz]	L, N, PE	3,500 [W]
	95Wac	208/230 [V]	20A slow	50/60 [Hz]	L, N, PE	3,500 [W]
	105Wac	208/230 [V]	20A slow	50/60 [Hz]	L, N, PE	3,900 [W]
	120Wac	208/230 [V]	20A slow	50/60 [Hz]	L, N, PE	3,900 [W]
Water cooled	60Wwc	208/230 [V]	16A slow	50/60 [Hz]	L, N, PE	2,100 [W]
	120Wwc	208/230 [V]	20A slow	50/60 [Hz]	L, N, PE	3,900 [W]
	200Wwc	230/400 [V] US/CA: 208/360 [V]	3X25A slow	50 [Hz] US/CA: 60Hz	L1, L2, L3, N, PE L-N: 230 [V] L-L: 400 [V] US/CA: L-N: 208 [V] L-L: 360 [V] solid Neutral required	5,800 [W]

4.10.2 Electrical connection for water cooling (optional)

Laser Power	Voltage/Frequency	Phases	Power
60W	230 [V] at 50 [Hz] 115 [V] at 60 [Hz]	L, N, PE	900 [W]
120W	230 [V] at 50 [Hz] 115 [V] at 60 [Hz]	L, N, PE	1,800 [W]
200W	230 [V] at 50 [Hz] 230 [V] at 60 [Hz]	L, N, PE	2,200 [W]



4.11 Materials



Caution when processing conductive materials (carbon fibers,...)! Conductive dust or particles in the ambient air might damage electrical components and lead to short circuits.

Bear in mind that those defects are NOT warranted.

Material	Engraving	Cutting	Marking
Acrylic	•	•	
Painted metal			•
Delrin	•	•	
Stainless steel (with Thermark)			•
Anodized aluminum			•
Veneer	•	•	
Handicrafts	•	•	
Glass	•		
Wood	•	•	
Gum rubber	•	•	
Ceramic	•		•
Cork	•	•	
Plastics	•	•	
Laser rubber	•	•	
Leather	•	•	
MDF	•	•	
Melamine	•	•	
Micro porous rubber	•	•	
Paper	•	•	
Polyester	•	•	
Stone	•		
PC (Polycarbonate)	•	•	

Other materials only with written approval by Trotec

The following materials are not recommended for processing:

Polyurethane PUR, Polymethylenoxide POM, Polyvinyl chloride PVC, Polyvinyl butyral PVB, Polytetrafluorethylene PTFE and materials containing epoxy or phenolic resins

Caution:



Trotec assumes no responsibility for any consequences of laser processing in any application such as medical or pharmaceutical applications.



5 Safety

5.1 Safety Instructions

Operating personnel must read and understand the operating instructions, and especially the “Safety” chapter, before operating the equipment. We recommend that the operator create internal instructional documentation for equipment safety and operation and to acknowledge receipt of these instructions/operating manual and participation in training/education in writing (see documents in the Appendices)

5.1.1 Intended user group

The machine may only be operated by authorized persons.

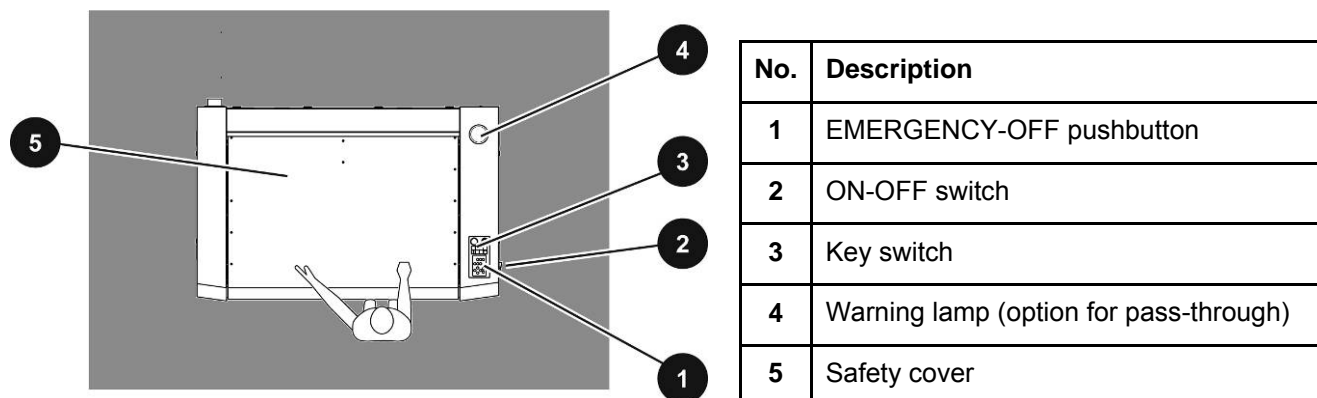
Authorities must be clearly defined and observed, so that no unclear competencies result under the aspect of safety. This applies in particular to work performed on the electrical equipment that may only be performed by specially trained professionals.

Activity	Intended group of users
Control/operation	Trained personnel
Other activities (e.g. error correction, maintenance)	Specially trained personnel or hired tradesmen

5.1.2 Operating instructions / Safety equipment

The safety zone is defined by the operator. Instructions and guidelines must be observed and followed!

Top view



5.2 General Safety Instructions



5.2.1 General

Hazard due to improper use of the machine!

Improper use may lead to hazards and bodily injury and damage to assets.

- **Prohibit or prevent improper use.**

Hazard due to disregard of safety instructions!

Improper activities at the machine may lead to death, bodily injury and/or damage to the machine.

- **Before startup read and observe the operating manual and safety instructions!**

Hazard due to faulty behavior by untrained persons!

Improper activities at the machine may lead to death, bodily injury and/or damage to the machine.

- **Inform personnel about machine functions and potential risks and record this in the training record.**
- **Observe legal regulations related to operation of machines and accident prevention regulations.**

Hazard due to poor lighting, poor housekeeping and moisture!

Shadows, reflections and poor housekeeping increase the risk of an accident.

- **Light the work area well, and always keep it clean and dry.**

Hazard due to missing, defective or bypassed safety equipment or machine parts!

Nonfunctioning or missing safety equipment or machine parts may lead to death, bodily injury and/or damage to the machine.

- **Carefully check safety equipment and machine parts for proper operation.**
- **In case of a functional fault or defect, immediately take prescribed actions to correct the problem.**

Hazard due to operator error (especially in setup mode)!

Adjustment and control with insufficient knowledge of the machine may lead to death, bodily injury and/or damage to the machine.

- **Before startup read and observe the operating manual and safety instructions!**

Hazard due to unsupervised operation of the machine!

Unsupervised operation may lead to fire resulting in death, bodily injury and/or damage to the machine.

- **Never operate the machine without supervision!**





Hazard due to reckless actions!

Reckless actions may lead to death, bodily injury and/or damage to the machine.

- **Make sure that no personnel remain in the hazardous area or at the machine.**
- **Do not leave any foreign objects in the machine (tools, etc.).**

Hazard due to operator error by unauthorized persons!

Adjustment and control of the machine by persons with inadequate knowledge of machine operation may lead to death, bodily injury and/or damage to the machine.

- **Never inadvertently actuate the machine.**
- **Turn the main switch off when the machine is not being used.**

Hazard during faulty work process!

Deviations in machine processing and work results may be an indication of hazardous conditions (jammed product, loose guides, etc.).

- **Observe machine movements for proper operation and check workresults on a regular basis.**
- **In case of deviations, initiate prescribed actions.**

Hazard due to premature actuation!

Premature actuation of the machine may lead to death, bodily injury and/or damage to the machine.

- **Do not reach into hazardous areas until you have turned off the main switch and placed a service sign on it.**

Hazard due to inadequate cleaning or functional checks!

Inadequate cleaning or functional checks result in machine damage. Accumulation of dirt could impair mechanical functions.

- **Regularly check machine and connection lines for damage and wear. In case of damage, immediately initiate prescribed actions.**
- **Keep machine, handles and switches free of oil, grease, dirt and moisture.**

Hazard due to unsuitable tools!

The use of improper tools could result in a risk of bodily damage and/or damage to the machine. Poor housekeeping leads to elevated accident risk.

- **Use proper tools for maintenance jobs.**





Hazard due to missing machine signage!

The risk of machine operator error results from making incorrect assumptions.

- **Replace missing machine signage.**

Hazard due to fault that cannot be corrected!

A fault that cannot be corrected may lead to injury and/or damage to the machine.

- **Turn off the machine and call customer service!**

Hazard due to improper disposal (waste, production materials)!

Improper disposal of waste materials can lead to environmental damage.

- **Recycle recyclable materials in separated and clean state. Dispose of waste in accordance** with applicable legal regulations.

Hazard due to inferior replacement parts or parts from other companies!

The use of inferior replacement parts or parts from other companies impairs machine safety and invalidates the supplied Conformity Declaration (CE).

- **Replace wear parts or damaged machine, safety or electrical components with original replacement parts. Only use the accessories or auxiliary** devices identified in the operating manual.

Hazard due to unsuitable work clothing or lack of protective equipment!

Risk of injury due to catching on machine parts, falling loads, inhalation of dust particles and noise.

- **Wear suitable work clothing.**
- **Wear safety glasses.**
- **Wear ear protection (mandatory for noise levels >85 dB(A))**





5.2.2 Laser

There are versions of the machine for:

- Safety class 2
- Safety class 4 – Carbon dioxide (CO₂) laser

Hazard due to laser radiation without protective measures!

Lack of protective measures can result in:

- Burns on the corneas of the eyes,
- Skin burns, and
- Fire hazard for clothing
- **Never operate machine without protective equipment**
- **Unapproved modification or disassembly of the laser is prohibited**
- **Never manipulate the laser unit**
- **Do not bypass the interlock system**

Hazard in processing unapproved material!

Processing of materials not listed and approved in this operating manual is prohibited.

Processing medical technology and pharmaceutical products!

Trotec assumes no responsibility for any consequences or the suitability of laser processing for any applications, especially those in the medical technology or pharmaceutical fields.

Hazard when working with the cutting table!

If not all of the partition plates are used in the cutting table, there is a risk of fire due to reflection of the laser beam.

- **Insert anti-reflective material beneath the partition plates.**





5.2.3 Transport

Hazard of loads impacting persons or objects!

Falling, tipping or sliding loads may lead to death, bodily injury and/or damage to the machine.

- **Never let loads impact persons.**
- **Set up unloading station before lifting loads. Avoid unnecessarily long periods of lifting.**
- **Do not lift loads until you have a clear view of the travel route. Choose travel routes that are as unobstructed as possible.**

Hazard due to lifting equipment operator error by untrained personnel!

Improper operation of lifting equipment may lead to death, bodily injury and/or damage to the machine.

- **Operation of lifting equipment only by trained personnel.**
- **Wear protective helmet, safety shoes and gloves.**



5.3 Secondary Risks



5.3.1 General

Hazard due to materials hazardous to health!

- In processing with or use (cleaning, etc.) of hazardous materials (toxic, etc.), appropriate measures should be taken to avoid health hazards.

Hazard due to operator error!

Errors are possible even when the machine is operated properly following the functions and sequences described in the operating manual. Such errors may lead to death, bodily injury and/or damage to the machine.

- Do not initiate any work or adjustment activities while any personnel are located in the hazardous area.

Hazard due to add -on options or machines!

Adding on options or machines can lead to unknown risks and hazards.

- Modifications made to the machine without approval by Trotec invalidates the Conformity Declaration (CE) supplied with the product.



5.3.2 Crushing hazard

Hazard due to moving parts!

Reaching, stepping or leaning into the hazardous area may result in serious injury by crushing body parts, severing fingers or the hand!

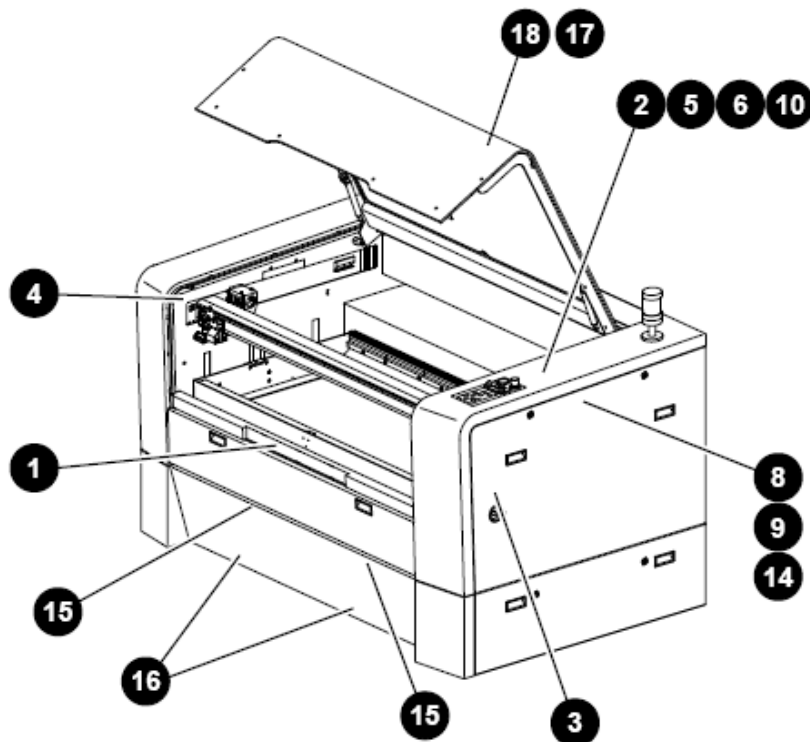
- Do not initiate any work process on the machine while persons (helpers, etc.) are located in the hazardous area of the machine.
- Prohibit access to the hazardous area.
- Wear suitable work clothing (no loose clothing, jewelry, or similar.).



5.4 Signage



The warning and information labels are attached in such positions of the device that could represent a source of danger during set-up and operation. Therefore, follow the information on the labels. If labels are lost or damaged, they must be replaced immediately.



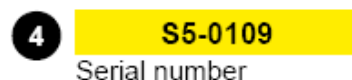
1 Warning of hand injury



2 Warning of laser radiation



3 Warning of electrical power



17 Warning of fire

5 VISIBLE LASER RADIATION
DO NOT STARE INTO BEAM
CLASS 2 LASER PRODUCT
EN 60825-1:2003

6 CAUTION
INVISIBLE CLASS 4 LASER RADIATION
WHEN OPEN AND INTERLOCKS
DEFEATED
AVOID EYE OR SKIN EXPOSURE TO
DIRECT OR SCATTERED RADIATION

8 CAUTION
INVISIBLE LASER RADIATION
WHEN OPEN AND INTERLOCKS DEFEATED
AVOID EYE OR SKIN EXPOSURE TO
DIRECT OR SCATTERED RADIATION

9 CAUTION
VISIBLE LASER RADIATION
WHEN OPEN DO NOT STARE INTO BEAM

10 LASERDIODE
MAX. POWER <0.99mW cw
WAVELENGTH 655nm

13 INPUT POWER
380-400 VAC 50Hz

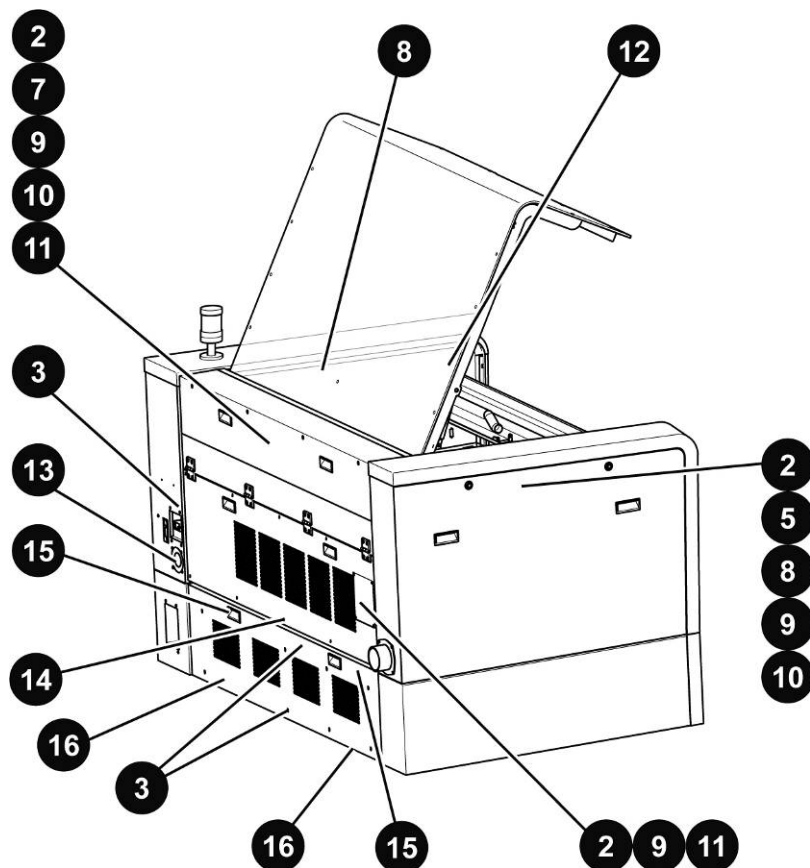
14 BEFORE OPEN
UNPLUG THE MACHINE FIRST

15 LIFTING POINTS

16 <- DO NOT LIFT HERE ->

18 NEVER OPERATE THE LASER SYSTEM
WITHOUT CONSTANT SUPERVISION:
EXPOSURE TO THE LASER BEAM MAY CAUSE
IGNITION OF COMBUSTIBLE MATERIALS WHICH
CAN CAUSE SEVERE DAMAGE TO THE EQUIPMENT





Warning of
laser radiation



Warning of
electrical power

5

VISIBLE LASER RADIATION
DO NOT STARE INTO BEAM
CLASS 2 LASER PRODUCT
EN 60825-1:2003

7

INVISIBLE LASER RADIATION
AVOID EYE OR SKIN EXPOSURE TO
DIRECT OR SCATTERED RADIATION
CLASS 4 LASER PRODUCT

8

CAUTION
INVISIBLE CLASS 4 LASER RADIATION
WHEN OPEN AND INTERLOCKS
DEFEATED
AVOID EYE OR SKIN EXPOSURE TO
DIRECT OR SCATTERED RADIATION

9

CAUTION
VISIBLE LASER RADIATION
WHEN OPEN DO NOT STARE INTO BEAM

10

LASERDIODE
MAX. POWER <0.99mW cw
WAVELENGTH 655nm

11

CAUTION
INVISIBLE LASER RADIATION
WHEN OPEN AVOID EYE OR SKIN EXPOSURE
TO DIRECT OR SCATTERED RADIATION

12

CAUTION
VISIBLE AND INVISIBLE LASER RADIATION
WHEN OPEN AVOID EYE OR SKIN EXPOSURE
TO DIRECT OR SCATTERED RADIATION

13

INPUT POWER
380-400 VAC 50Hz

14

BEFORE OPEN
UNPLUG THE MACHINE FIRST

15

LIFTING POINTS

16

<- DO NOT LIFT HERE ->



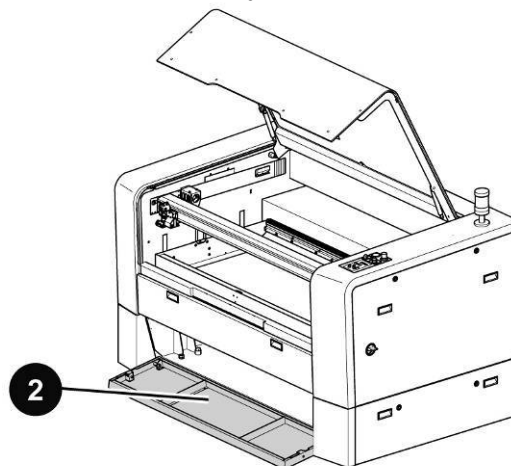
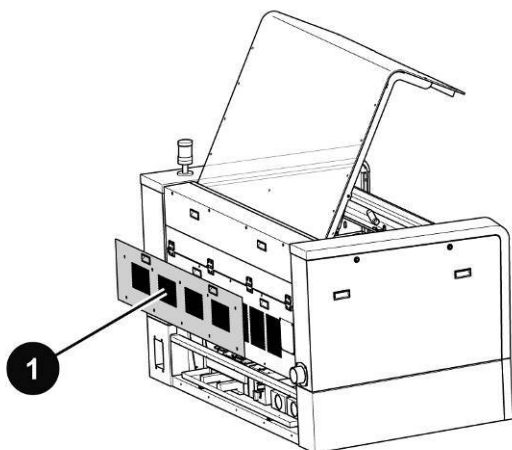
6 Transport - Storage – Setup

The machine has 4 rollers for moving it. All 4 feet must be fully screwed in before moving. The machine is also designed to be moved by forklift.

6.1 Forklift transport

Before moving the machine, perform the following on the base frame:

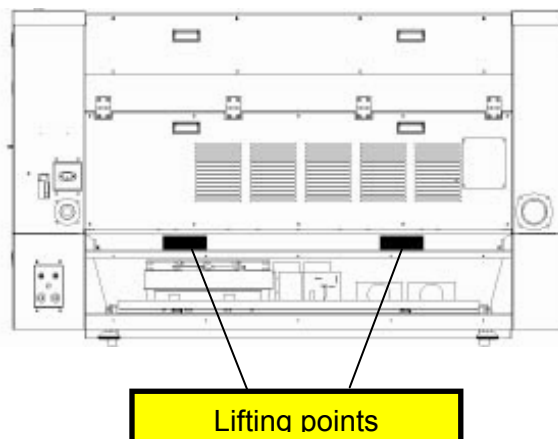
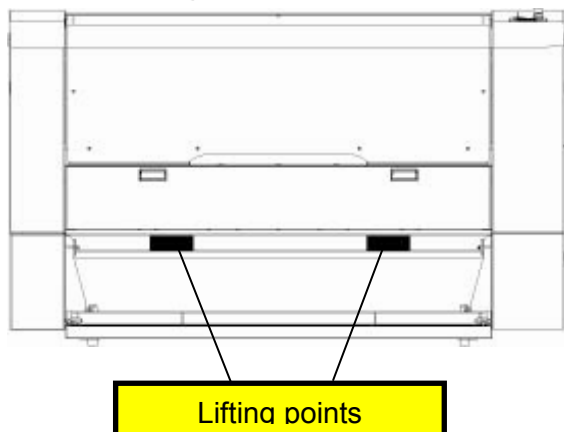
- Remove rear trim panel (1)
- Open the front door (2) with a 10mm Allen key



In addition, the following should be performed:

- Disconnect all attached lines.
- Fasten down all moving parts to stationary and sufficiently stable parts of the frame.

6.2 Lifting points



The machine may only be lifted and transported:

- Under the guidance of a 2nd person, and
- At the points identified.

After moving the machine, reinstall the rear trim panel (1) and close the door (2).





6.3 Shipping conditions

- Remove table before shipping
- When transporting outdoors, only transport in shipping vehicles with roofs or sufficient weather protection.
- Protect machine from shipping damage using tie-down straps, packaging materials and sufficient gaps to other shipped goods.
- Ambient temperature for transport:
 - Minimum temperature +10 °C (+50 F)
 - Maximum temperature +40 °C (+104 F)
- Handle machine and machine parts with care.
- Do not place any heavy loads on top of the machine or machine parts.
- Avoid harsh impacts.
- Only lift at the specified points.
- Take special care in transporting electronic components.

6.4 Unloading, inspection and damage reporting

After unloading:

- Remove shipping packaging.
- Dispose of packaging according to applicable waste disposal law.
- Inspect machine and machine parts for shipping damage.
- Check shipment for completeness.

In case of shipping damage or incomplete shipment:

- Immediately document the details of the damage.
- Also note the claim on shipping papers.
- Photograph the damage.
- Send report to TROTEC.

6.5 Storage conditions

- Store machine and machine parts in a dry area.
- Protect machine and machine parts from scratches.
- Store electronic components especially carefully in a packaged state.
- In case of longer term storage, protect exposed metal parts (e.g. oil the parts).
- Ambient temperature for storage:
 - Minimum temperature +10 °C (+50 F)
 - Maximum temperature +40 °C (+104 F)

6.6 Storage Location

In storage room or packaged with adequate weather protection.
The storage location must be free of caustic materials, vapors and combustible materials.



6.7 Installation Site

- Weather-protected, roofed building with vehicular access
- Low dust environment

Properties of the installation site:

- Adequate lighting
- Uniform, level, horizontal and firm floor, planarity +/-5 mm (+/-0.1969 inch), no special foundation required
- Load bearing capacity of base frame at least 300 kg/m² (62 lbs/sq.ft.)

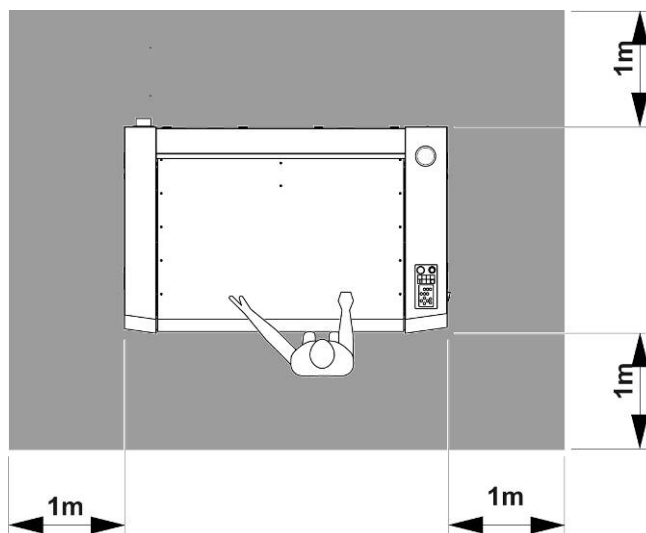
Installation site must:

- Be free of noisy electrical installations, hoses and pipe lines
- Have power supply that is free of fluctuations
- Be shielded from EMC

Ambient Conditions:

- Relative humidity: 40% to max. 70%
- Ideal room temperature: +15°C to +25°C (+59 F to +77F)
- Dust-free environment (2nd degree per IEC60947-1)

6.8 Space Requirements

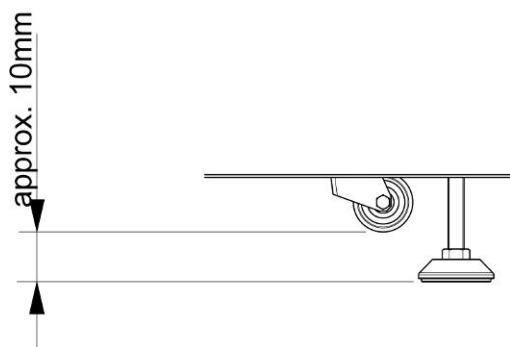
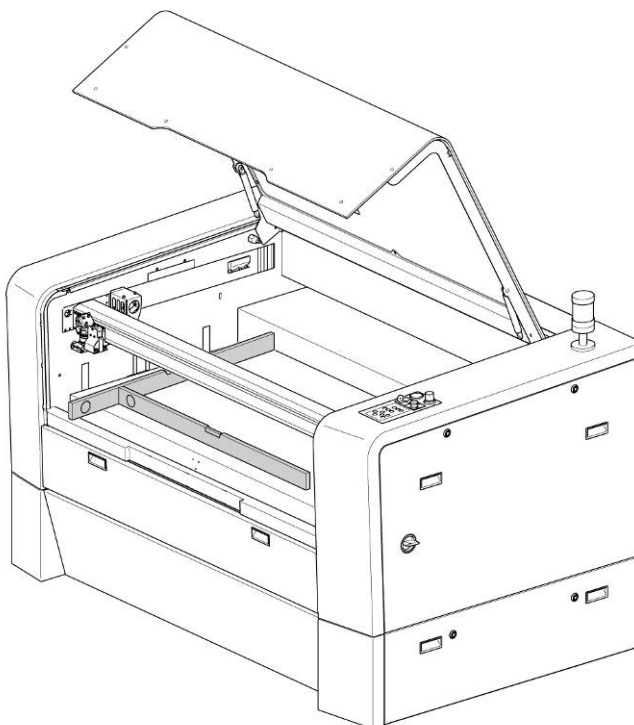


6.9 Necessary Feed Lines

- Electrical
- Compressed air: Free of oil, water and dirt at max. 10 bar (145 psi)
- Gases (Neutrogen, Argon, protective gas, ...)



6.10 Setup



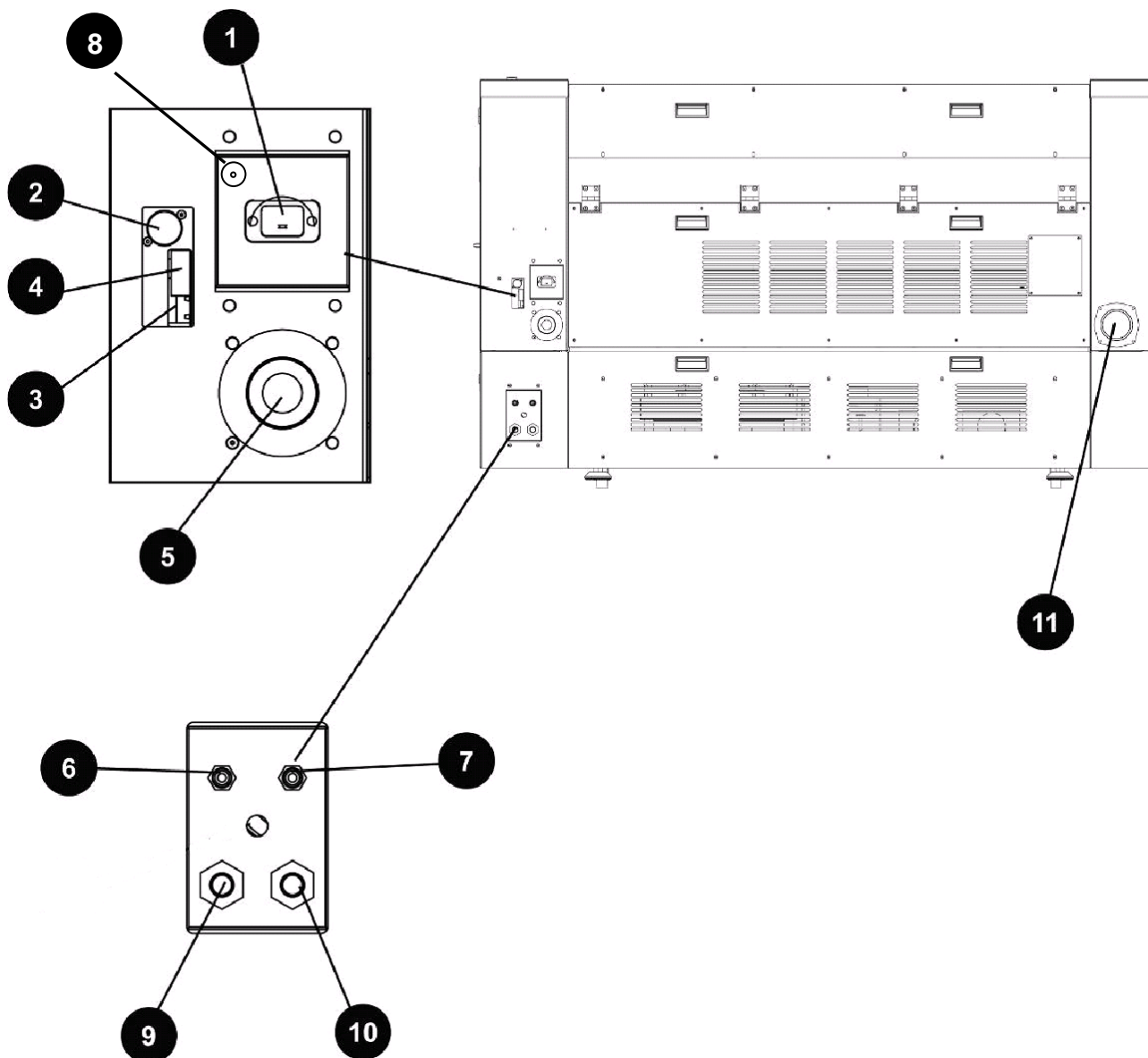
Unscrew all 4 feet until the distance from rollers to floor is approx. 10 mm (0.4 inch)

Tools: Wrench 22mm and 24 mm

Align machine to horizontal level by adjusting feet, and check with a fluid level



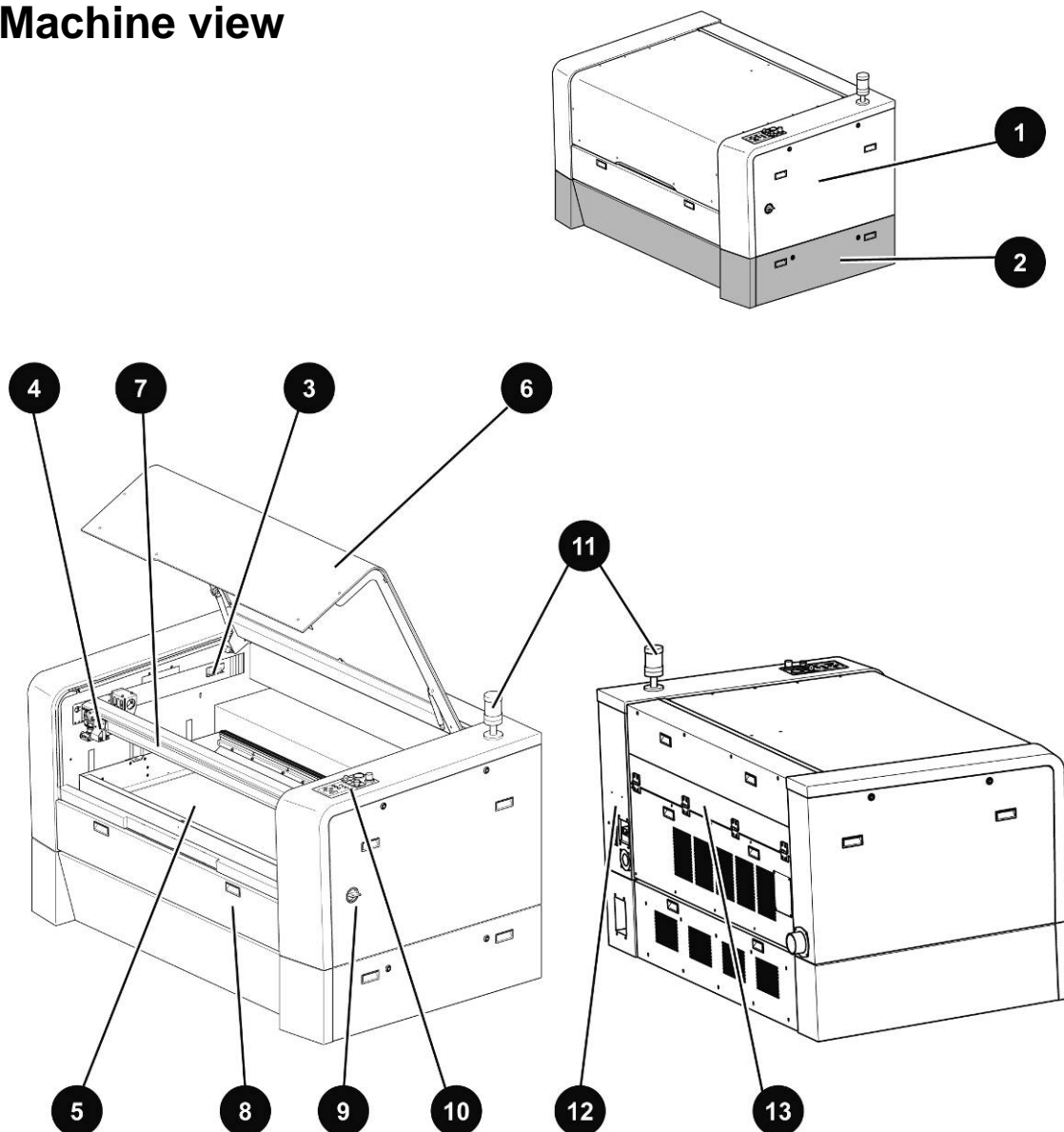
6.11 Connections



Item	Description	Item	Description
1	Electrical power	7	Gas 2
2	Connection cable: Vacuum	8	iCut BNC connector
3	USB for PC	9	Cooling water inlet
4	RS-232 for PC (necessary for iCut/AlphaCam)	10	Cooling water drain
5	Vacuum: Working head	11	Vacuum for vacuum table
6	Compressed Air (Gas 1)		



7 Machine view

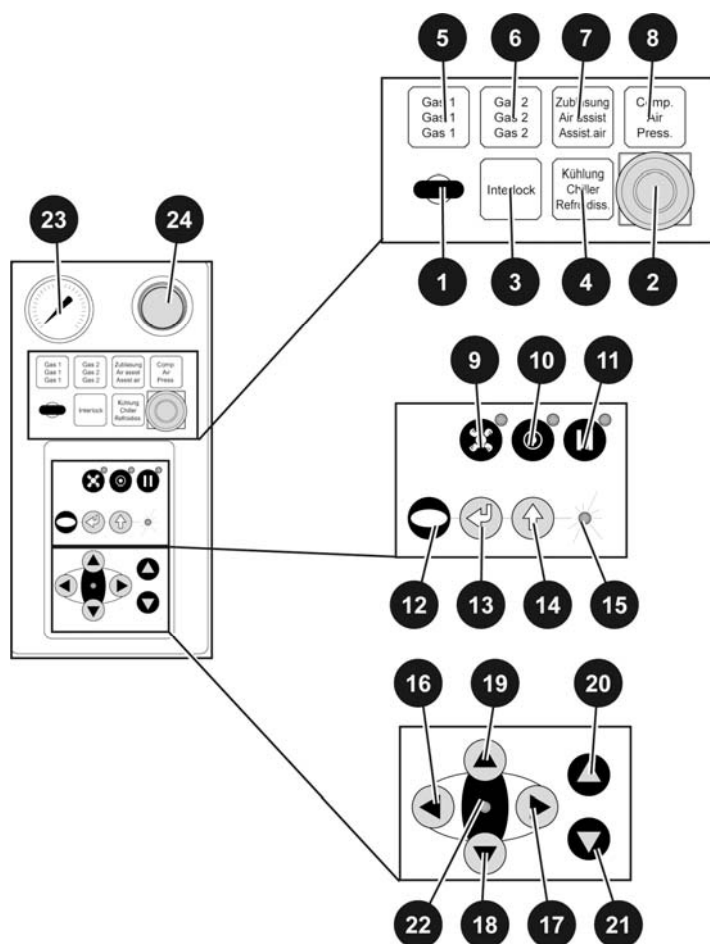


Item	Description	Item	Description
1	Machine	8	Workpiece removal door
2	Base frame with electronic components	9	Main switch
3	Auto-focus sensor	10	Operator panel - keypad
4	Engraving head	11	Warning lamp (option for pass-through)
5	Engraving table	12	Manufacturin label
6	Safety cover	13	Pass trough (option)
7	X-Axis		



8 Operation

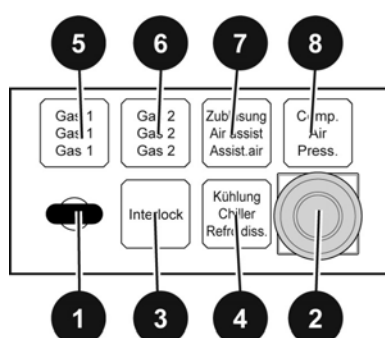
8.1 Key pad – Overview



Item	Description	Item	Description
1	Key switch	13	Button: Start (repeat) - JobControl only
2	EMERG. OFF push button	14	Button: "Shift" for 2 nd function key level
3	Indicator: Interlock on/off	15	LED status indicator: Laser beam
4	Indicator: Cooling on/off	16	Button: Working head to left
5	Button: Compressed Air (Gas 1)	17	Button: Working head to right
6	Button: Gas 2	18	Button: Working head forward
7	Air assist (internal)	19	Button: Working head backward
8	Light: compressed air, Voltage (AC, DC)	20	Button: Work table upward
9	Button: Vacuum on/off	21	Button: Work table downward
10	Button: Standby	22	LED status indicator
11	Button: Pause	23	Manometer for gas pressure
12	Service LED	24	Pressure regulator



8.2 Key pad – Description



Key switch (1)

EMERGENCY OFF pushbutton (2)

Pressing this button shuts the machine down completely. The EMERGENCY OFF pushbutton must be unlocked to start up the machine again.

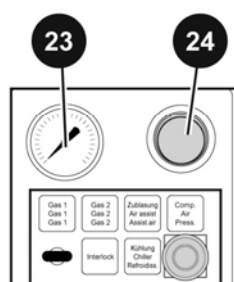
Interlock on/off indicator (3)

Interlock indicator lights when the machine is turned on, and:

- Guard door or door is open
- Cover plate is not installed

If the Interlock Indicator is unlit, the machine is ready for production.

Cooling on/off indicator (4)



Switching-in process gas

- Compressed Air (Gas 1) on/off key (5)
- Gas 2 on/off key (6)

Pressure regulator (24)

This is used to adjust the required gas pressure of the gas used. The pressure setting is displayed on the:

Manometer for gas pressure (23)

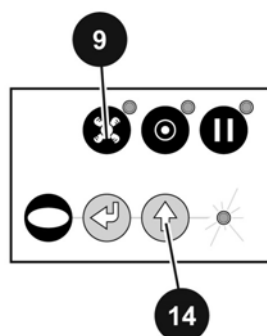
Air assist on/off indicator (7)

Air assist is switched on/off by simultaneously pressing these keys:

“Shift” for 2nd function key level (14)

and

Vacuum on/off (9)

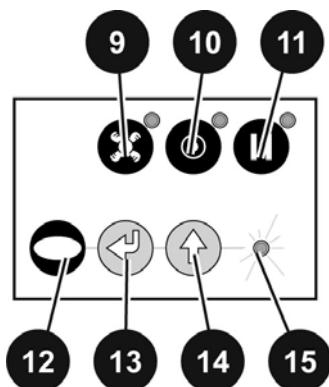


Compressed air, voltage (AC, DC) (8)

Lights in following conditions:

- Compressed air missing
- AC-Voltage failure (L1, L2, L3, N)
- DC-Voltage failure (power supplies)





Vacuum on/off key (9)

When this key is pressed it lights and vacuum is switched on for the vacuum table

Standby key (10)

During machine operation key illumination is off.
When the key is pressed it lights and the machine is in Standby mode, i.e.:

- Laser in Ready state
- Lighting of work table is deactivated
- Blowers for laser tubes are deactivated

Pause key (11)

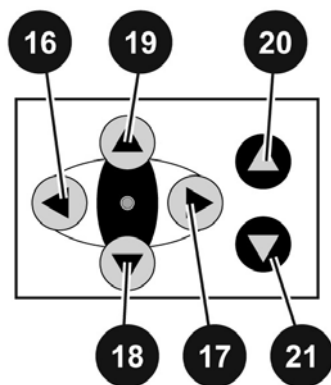
During machine operation key illumination is off.
When the key is pressed it lights and the work process being executed is stopped

Lamp for service plug (12)

Lights when a service plug is inserted (Technician)

Start (Repeat) key (13)

Key for starting the job program and repeating the last job program; see programming manual regarding this



“Shift” key for 2nd function key level (14)

For additional operations. When this key is pressed together with the following keys, the functions indicated are activated:

Vacuum on/off key (9):

Air assist on/off

Pause key (11):

Stops the job program

Working head keys (16) to (19) or

Work table keys (20) and (21):

These keys drive the laser head to the end position (left/backwards)

Working head keys (16) and (19):

These keys drive the laser head to the reference point

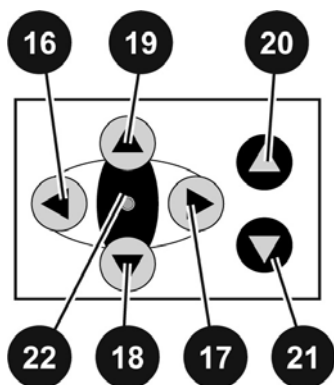
Start key (13):

Tests the laser for proper function

LED status indicator for laser beam (15)

Lightened when laser is operating





Movements of the laser head:

- Key: Working head to left (16)
- Key: Working head to right (17)
- Key: Working head forward (18)
- Key: Working head backward (19)

When 2 adjacent keys are pressed simultaneously (e.g. keys 16 and 19), the laser head moves diagonally.

Movements of the work table:

- Key: Work table upward (20)
 - Key: Work table downward (21)
- These keys are needed for focusing.

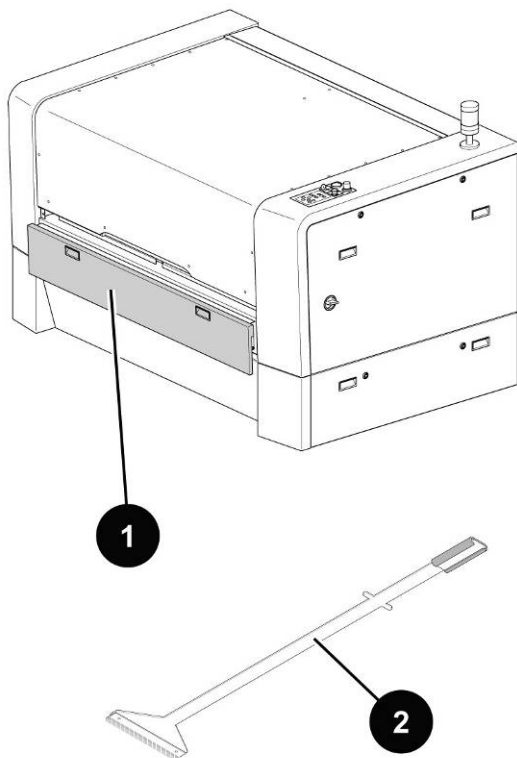
LED status indicator (22)

- Flashes 1x/sec -> Machine ready for operation
- Flashes 2x/sec -> Interlock ON



8.3 Workpiece Removal Door

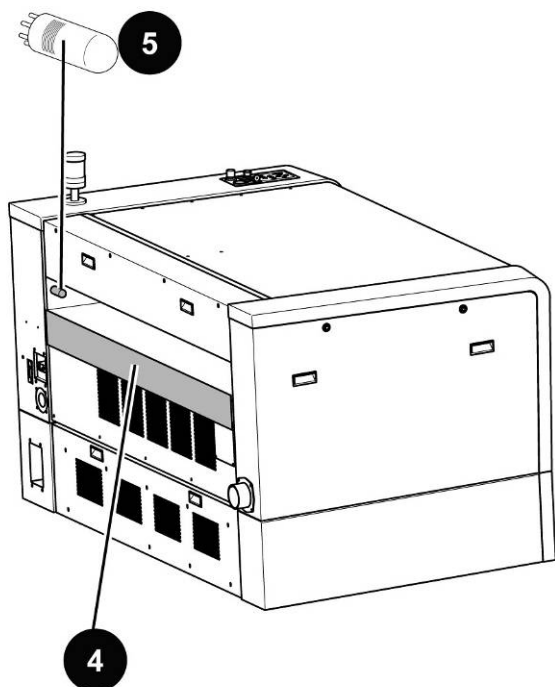
- Open door (1) by pulling forward on the two handles
- Remove the workpieces with the broom (2)
- The bracket (3) for the broom has 3 magnets and is mounted on the side of the machine



Door must be closed during laser operation.

8.4 Workpiece Removal Door

- Open the pass-through by folding down door (4)
- Insert bypass jumper in socket (5) for pass-through.



Do not reach into opening during operation.



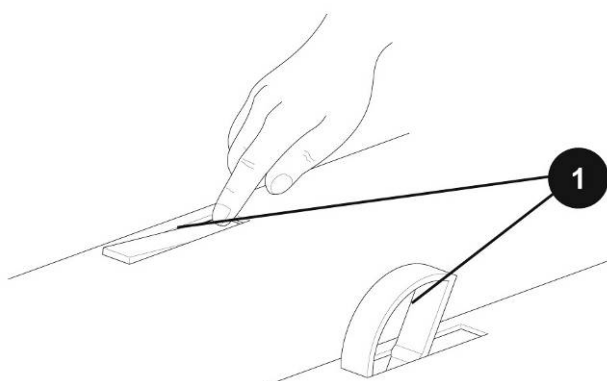
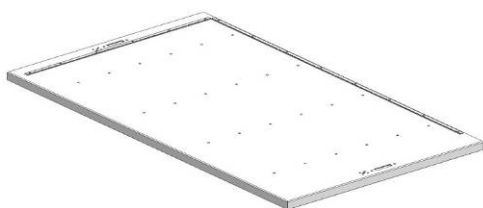
8.5 Tables

8.5.1 Base Frame (with/without lamellas)



- The frame is permanently attached to the machine's Z axis.
- The following individual table variants are placed on it (with or without lamellas):
 - Engraving table
 - Vacuum table
 - Cutting table
- The table is secured in the center by mounted latching pins.
- It is easy to remove parts that have fallen into the frame via a door.
- To do this, the table must be driven to its lowermost position.
- The "Rotary engraving attachment" option is placed directly in the base frame.

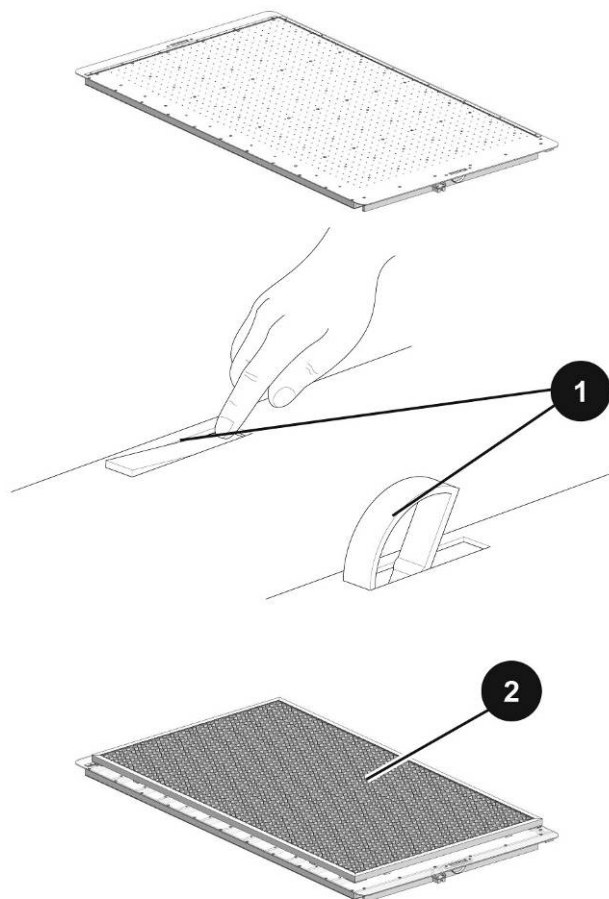
8.5.2 Engraving Table (Standard table)



- The engraving table rests on the base frame and is supported by additional braces there.
- The engraving table is only for engraving heavy objects, such as metals, marble, granite, glass, heavy wood and acrylic parts.
- Two swiveling handles (1) make it easier to lift out the engraving table. To use them, swivel the handles (1) upward.

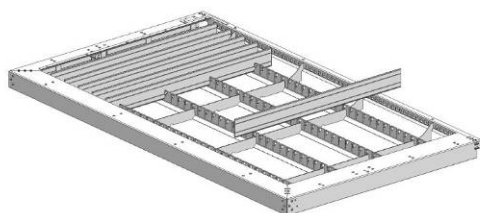


8.5.3 Vacuum Table



- The vacuum table rests on the base frame and is supported by additional braces there.
- The vacuum table is only intended for engraving and/or cutting thin and lightweight materials such as films, plastic laminates, veneers, thin sheets of wood, paper, cardboard, and similar.
- The entire surface of the vacuum table must be covered to ensure the maximum vacuum effect
- Two swiveling handles (1) make it easier to lift out the engraving table
To use them, swivel the handles (1) upward.
- To ensure even better contact (2), the "Contact" option is recommended.

8.5.4 Cutting Table



- The cutting table rests on the base frame and is supported by additional braces there.
- Specially shaped air guides are used in the cutting table. This ensures that parts falling into the frame are not damaged by the laser. Custom made acrylic bars may also be used.



Hazard when working with the cutting table!




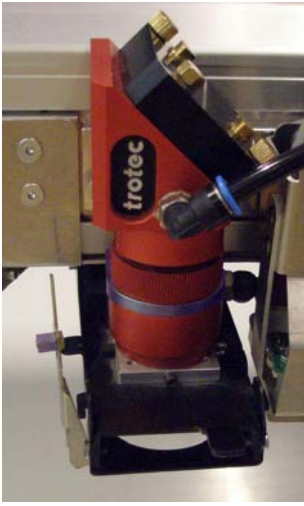

If not all of the partition plates are used in the cutting table, there is a fire hazard due to reflection of the laser beam.

Insert an anti-reflective material beneath the partition plates



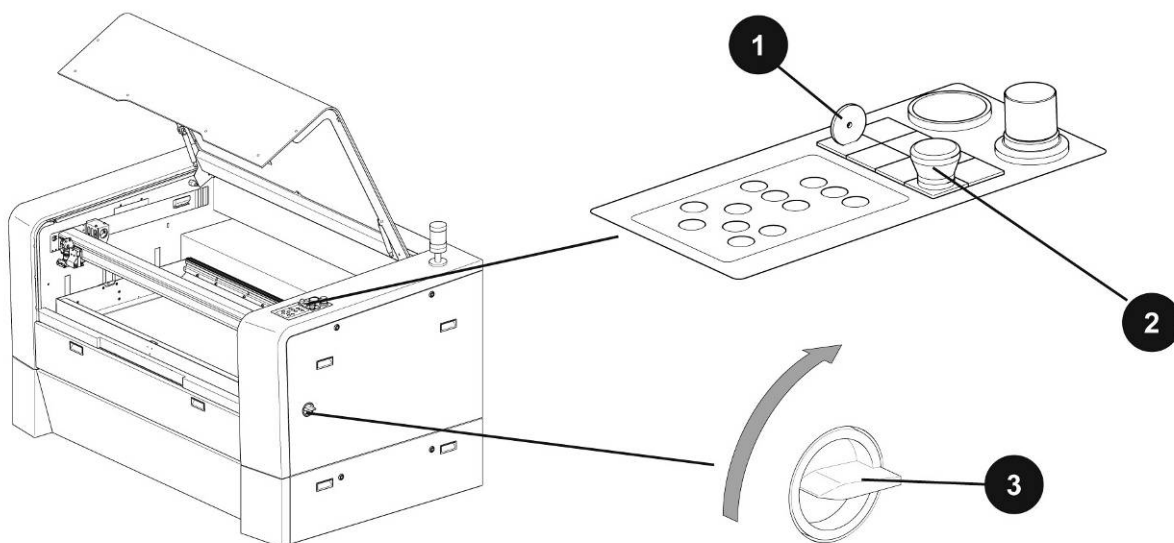
8.6 Lenses

The following lenses are available for SP500.

<p>2" black # 15359</p> 	<p>2,5" silver # 15410</p> 	<p>2,5" clearance bright green # 30659</p> 
<p>3.75" rotary violett # 30645</p> 	<p>5" blue # 15411</p> 	



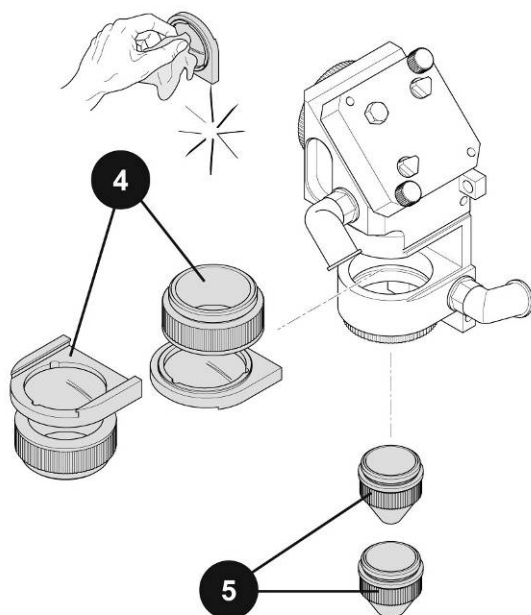
8.7 Operation



Enable machine with key (1)

Check whether EMERGENCY-OFF
pushbutton (2) is unlocked

Turn on main switch (3)



Drive the laser head to its forward-most
position

Key



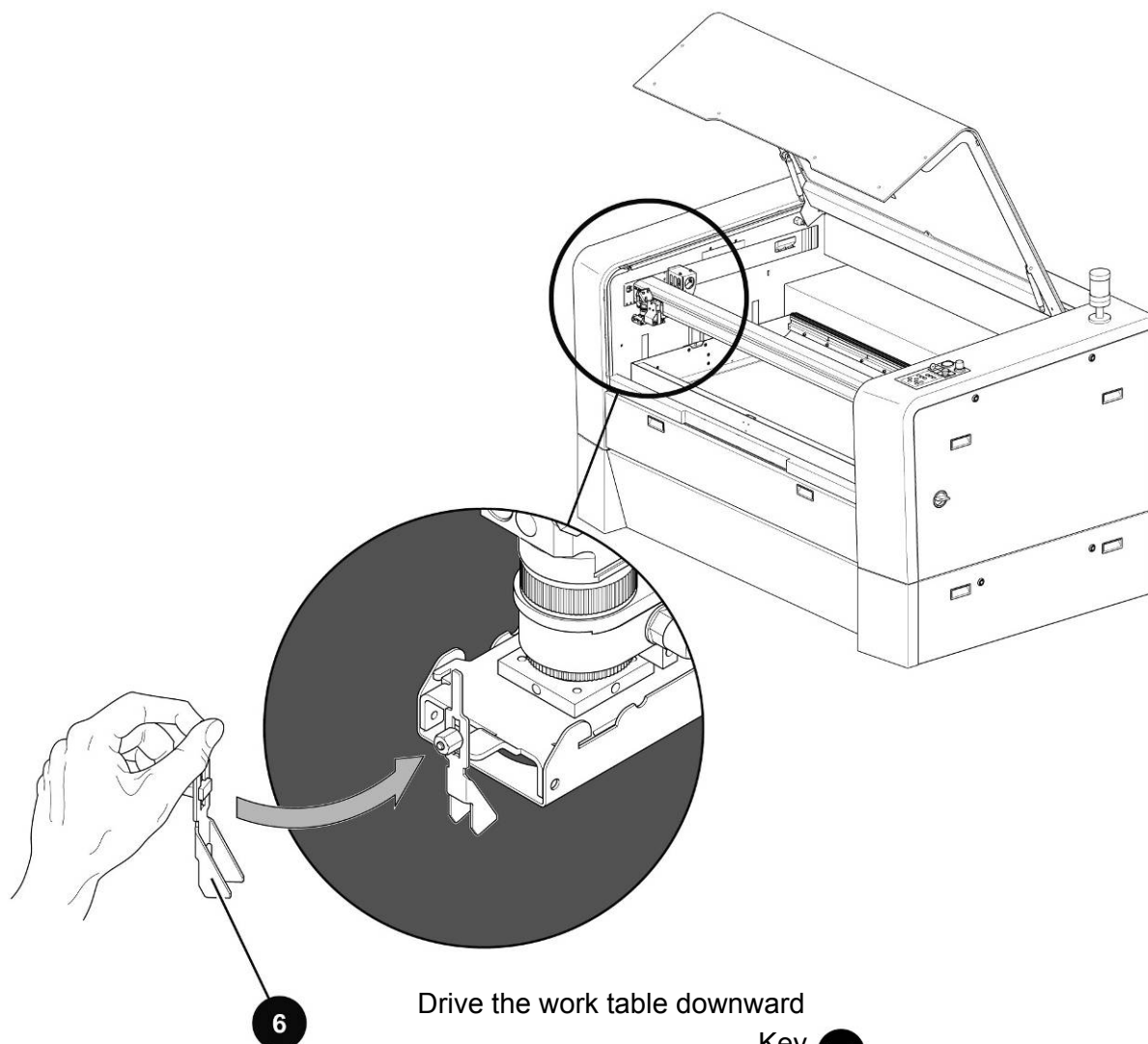
Clean lens (4), reinstall and secure

Install nozzle (5)

Drive the laser head to reference point by
simultaneously activating these

Keys





Drive the work table downward

Key ▼

Place material on table

Focusing the laser

Place focus tool (6) on laser head

Drive the work table upward until focus tool drops tilts

Key ▲

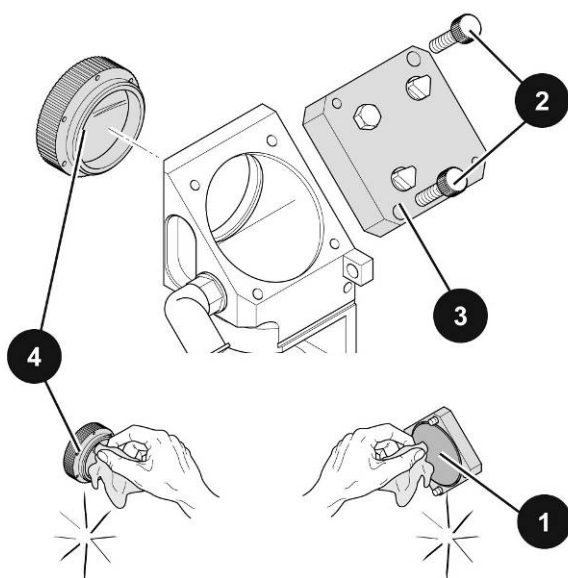
Machine is now ready for production



9 Maintenance

9.1 Cleaning optics on the Laser Head

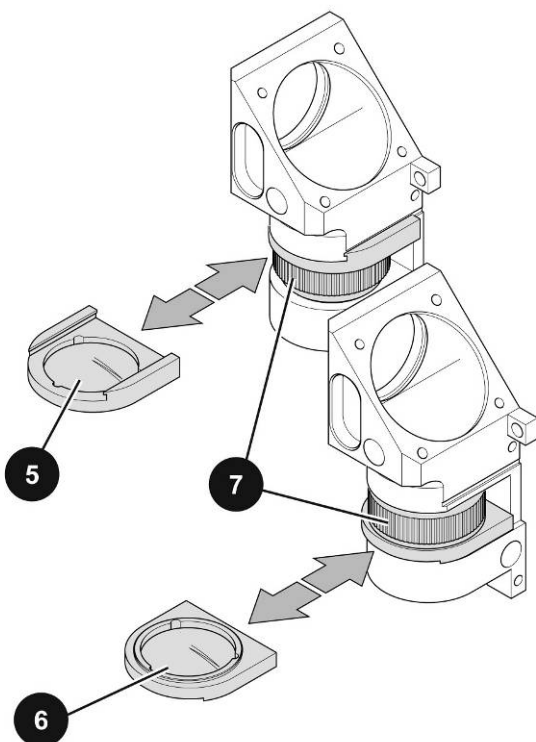
Cleaning the mirror (1):



- Loosen both screws (2)
- Remove mirror mount (3)
- Check mirror (1) for damage
- Clean mirror (1) with cleaning fluid and cleaning cloth
- Check mirror (1) once again for damage
- Reinstall mirror mount (3) and secure with two screws (2)

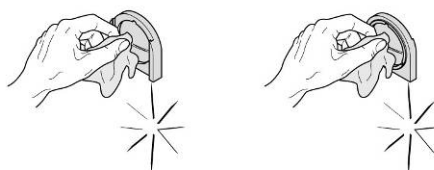
Cleaning the 5" lens (4):

- Unscrew 5" lens (4)
- Check 5" lens (4) for damage
- Clean both sides of 5" lens (4) with cleaning fluid and cleaning cloth
- Check 5" lens (4) once again for damage

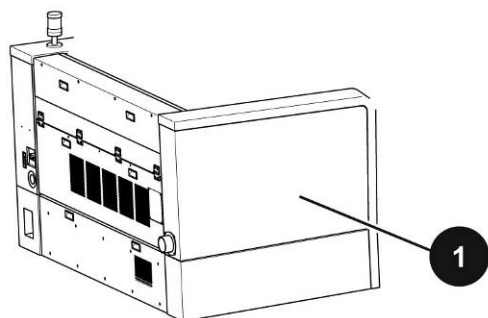


Cleaning lenses (5) and (6):

- Loosen lenses (5) and (6) by screwing retainer inward (7)
- Remove lenses (5) and (6)
- Check lenses (5) and (6) for damage
- Clean both sides of lenses (5) and (6) with cleaning fluid and cleaning cloth
- Check lenses (5) and (6) once again for damage
- Insert lenses (5) and (6) and clamp with retaining ring (7)

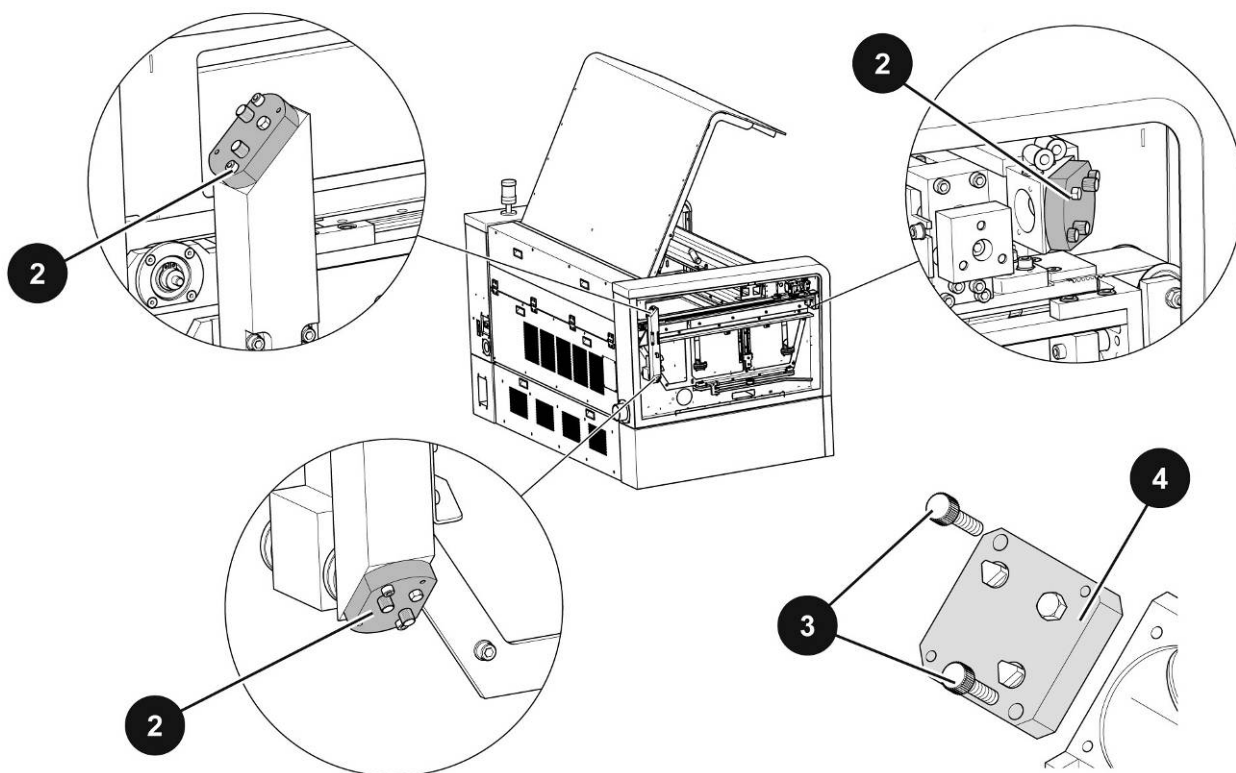


9.2 Cleaning the Mirrors

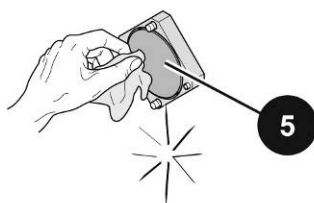


- Unlock cover (1)
- Tool: Metric Allen wrench No. 10

- Remove cover (1) by pulling on the handles



3 mirrors (2) must be cleaned:



- Loosen both screws (3)
- Remove mirror mount (4)
- Check mirror (5) for damage
- Clean mirror (5)
- Cleaning fluid and cleaning cloth
- Check mirror (5) once again for damage
- Put on mirror mount (4) and secure with two screws (3)





9.3 Maintenance plan

	daily	weekly	monthly	yearly
Laser				
Lens, mirror #4 <input type="checkbox"/>	Check Cleaning if required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
mirrors #1...3		Check Cleaning if required		
Processing table and rulers <input type="checkbox"/>	Cleaning			
Entire working area – general cleaning <input type="checkbox"/>			Cleaning	
Exhaust System				
Bag filter	According to the operation manual of the exhaust system			
Filter mat				
Particle filter				
Activated carbon filter <input type="checkbox"/>				
Cooling System				
Pump filter <input type="checkbox"/>	According to the operation manual of the exhaust system			
Condenser heater <input type="checkbox"/>				
Cooling agent				
Pump				

For detailed information on the maintenance activities on exhaust and cooling systems please refer to the respective manuals.





10 Appendix

10.1 EU – Declaration of conformity

The manufacturer

TROTEC Produktions- u. Vertriebs GmbH.

Linzer Strasse 156,
A-4600 Wels, OÖ.,
AUSTRIA

hereby declares that the following product

TROTEC 8014 Speedy 500
Model N° 8014 Speedy 500 C45/60/75/85/95/105/120/200

has demonstrated conformity to the following guidelines:

2006/42/EG Directive for Machines
2006/95/EG Low Voltage Directive
2004/108/EG EMC Guideline

Applied during design and construction of this product:

- EN ISO12100 Machine Safety
- EN 60335-1/2007 Safety of Household and similar Appliances
- EN 55014-1/2006, EN 55014-2/1997 Electromagnetic Compatibility
 - EN 60204-1 Machine Safety – electr. Equipment
- EN 60825-1/2007, EN 60825-4/2006 and EN 60825-14/2006
Safety of Laser Equipment
- EN 60950/2006 Safety of Electric Devices for Informatics including
electric Office Machines
- EN 55022/2008, EN 55024/2003 Electromagnetic Compatibility

Wels,

Trotec Produktions u. Vertriebs Ges.m.b.H





10.2 Acceptance report

Dear customer!

Please check applicable items:

We request your confirmation of properly completed transfer of the machine

Please transmit a copy of this document – filled out and signed by an authorized company representative – to an employee of our sales affiliate for forwarding to the manufacturer.

- ☐ Machine parts checked for shipping damage
- ☐ Machine parts checked against delivery note
- ☐ Setup of the machine discussed
- ☐ Startup of the machine discussed
- ☐ Operation of the machine discussed
- ☐ Maintenance of the machine discussed
- ☐ Electrical voltage checked
- ☐ Safety Instructions discussed
- ☐ Trial run performed
- ☐ Deficiencies determined

Thank you very much.

The machine with the

machine designation: SP500

has been checked according to the listed items and has been transferred properly.

City, Date

Company stamp / Signature





10.3 Training Verification Form

Employee/Trainee:

Trainer:

Date of Training:

The above mentioned Employee received instruction on the operation of the SP500 Lasersystem.

Especially the following topics are covered:

- Machine Function
- Danger Area
- Warnings
- Position **Emergency-OFF** Button
- Personal Protective Equipment
- Operating Facilities
- Work Flow
- Setting-up
- Taking into Service and Shutdown
- Announcement of unexpected working result and the resulting procedure
- Announcement of Failure and instituting Procedure
- Responsibility on remedial measure
- Operation Manual and its depository for inspection

.....
Signature of Trainer

.....
Signature of Trainee





10.4 Response Form

If you face any trouble with the machine, please provide the following information and add a Servicefile (procedure is described on the following pages).

Date	
------	--

Machine Details

Serialnumber	
JobControl Version	
Driver Version	
Layout Software	
Firmware Version	

Contact Details

Name	
Country	
Phone Number	
Email address	

Problem Description

--

Does an Error message show up on the PC, if so which one?

--

What happened before the error showed up? (Thunder&Lighting, Windows-Update,...)

--

What was tried to solve the problem?

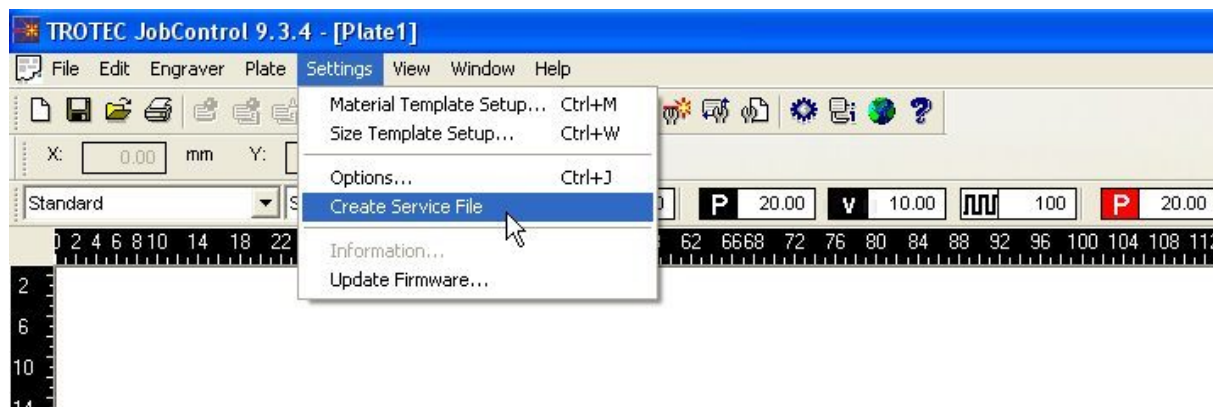
--

Please send the information to your sales representative or to techsupport@troteclaser.com.

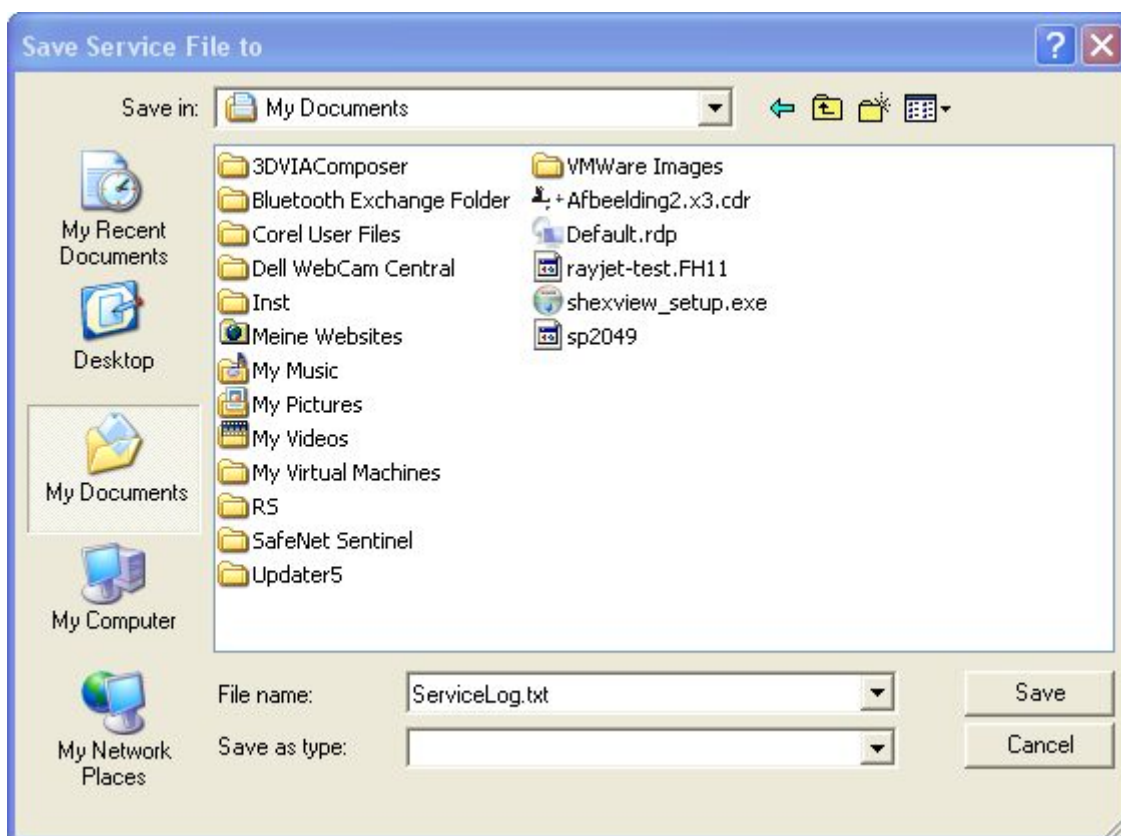


10.5 How to create a Service File

1. Start JobControl and go to Settings> Create Service File.

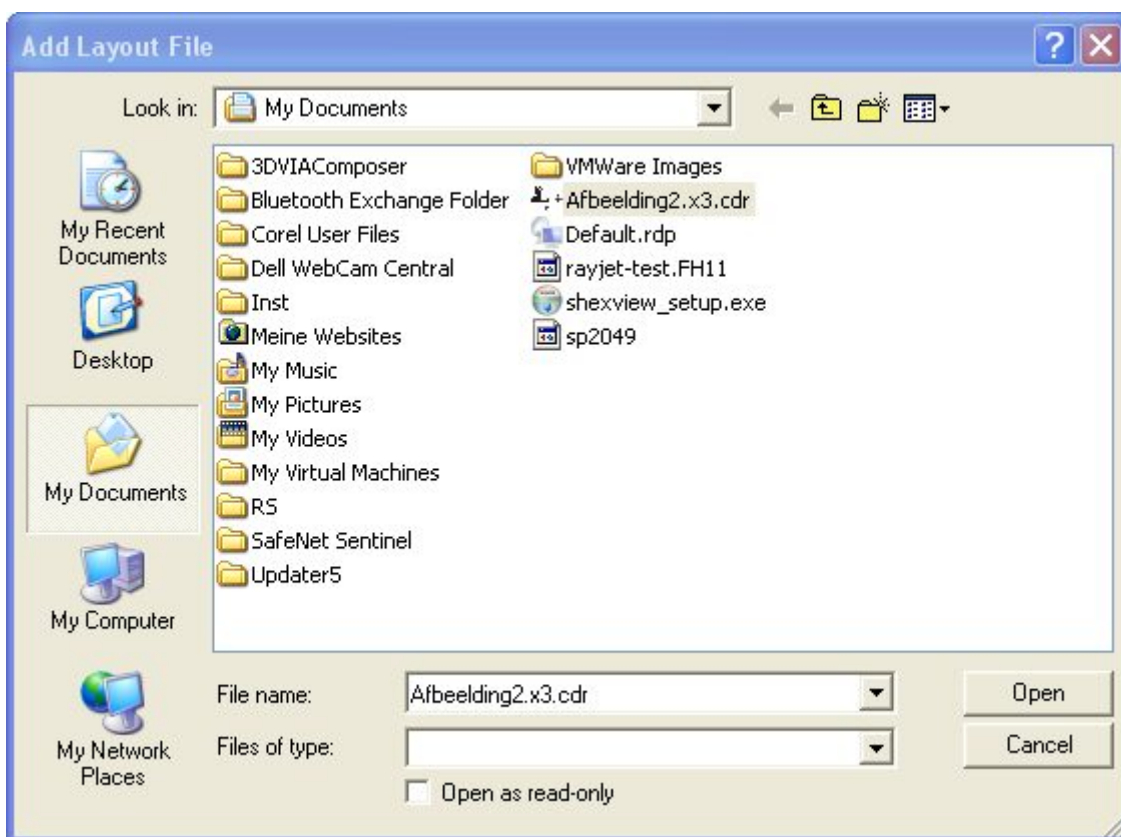


2. The window „Save Service File to“ shows up. Please select a directory to save the file and click on „Save“.

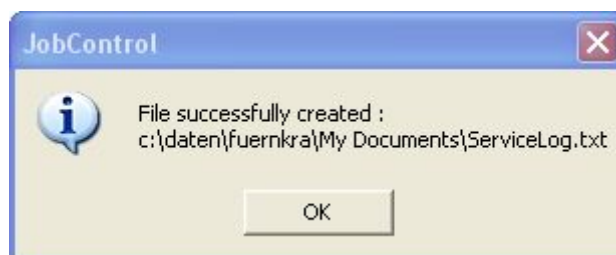


Appendix

- The window „Add Layout File“ shows up. Please select the layout file, which was sent most recently to JobControl and possibly caused a failure (example: Corel file, Photoshop file, AutoCAD file,...). Click on „Open“.



- The following window confirms, that the Service File (ServiceLog.txt) was created successfully.



- Please send the Service File to your sales representative or to techsupport@troteclaser.com.

